FORM FOR PROPOSAL FOR 2014 NATIONAL ELECTRICAL CODE®

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5 p.m., EST, Friday, November 4, 2011, to be considered for the 2014 National			Date Rec'd:	
Electrical Code. Proposals received after 5:00 p	.m., EST, Friday, November 4, 2011,			
will be returned to the submitter. If supplementa	ry material (photographs, diagrams, re	ports,		
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Date 2 Nov 2011 Name John C. Wiles, Jr		Tel. No.	575-646-6105	
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Please indicate organization represented (if any)	/ INDUSTRY FORUM			
1. Section/Paragraph 690.5				
2. Proposal Recommends (check one):	new text revis	sed text	deleted text	
3. Proposal (include proposed new or revised wordi	ng, or identification of wording to be del	eted): [Note	: Proposed text should be in	
legislative format; i.e., use underscore to denote wording (deleted wording).]	to be inserted (<u>inserted wording</u>) and strike	-through to	denote wording to be deleted	
690 5 Ground-Fault Protection Grounde	d de photovoltaic arrays shall be	nrovideo	d with dc ground-fault	
protection meeting the requirements of 600	$5(\Lambda)$ through (C) to reduce fire	hazarda	Ungrounded de	
photocologic arrays shall comply with 600	25	nazarus.	oligiounded de	
photovoltaic arrays shall comply with 090.	55.			
		.1 .		
Exception No. 1: Ground-mounted or pole-	mounted photovoltaic arrays wi	th not mo	bre than two paralleled	
source circuits and with all dc source and o	dc output circuits isolated from l	buildings	shall be permitted without	ıt
ground fault protection.				
	.1 1 11	• 1		
Exception No. 2: PV arrays installed at oth	er than dwelling units shall be p	ermitted	without ground fault	
protection where the equipment grounding	conductors are sized in accorda	nce with	-690.45.	
(A) Carrier d Fareld Data data and Later				1.
(A) Ground-Fault Detection and Interru	ption. The ground-fault protection	on device	e or system shall be capab	ele
of detecting a ground-fault current, interrup	oting the flow of fault current, ar	id provid	ing an indication of the	
fault. Automatically opening the grounded	conductor of the faulted circuit	to interru	pt the ground-fault curren	it
path shall be permitted. If a grounded cond	uctor is opened to interrupt the g	ground-fa	ult current path, all	
conductors of the faulted circuit shall be au	tomatically and simultaneously	opened.	-	
Manual operation of the main PV dc discor	nect shall not activate the grour	d-fault p	rotection device or result	in
grounded conductors becoming ungrounde	d The ground fault protection d	evice sha	all be permitted to	
automatically isolate the PV source and our	to the ground had protection d	invortor (ar charge controller to	
automatically isolate the r v source and ou	iput encuns before anowing the		or charge controller to	
export power.				
Informational Note ⁻ Ground fault of	urrents can originate from an un	grounded	l conductor to ground	
connection (as defined in Art 100)	and also from a grounded condu	tor to or	ound connection Ground	1
fault currents from either source ca	a cause fires and pose shock haz	ards		-
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(B) Isolating Indentifying Faulted Circuits. The faulted circuits shall be **isolated** <u>identified</u> by one of the two following methods:

The ungrounded conductors of the faulted circuit shall be automatically disconnected.
The inverter or charge controller fed by the faulted circuit shall automatically cease to supply power to output circuits.

(C) Labels and Markings. A warning label shall appear on the utility-interactive inverter or be applied by the installer near the ground-fault indicator at a visible location, stating the following:

WARNING ELECTRIC SHOCK HAZARD IF A GROUND FAULT IS INDICATED, NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

When the photovoltaic system also has batteries, the same warning shall also be applied by the installer in a visible location at the batteries.

4. Statement of Problem and Substantiation for Proposal: (Note: State the problem that would be resolved by your recommendation; give the specific reason for your Proposal, including copies of tests, research papers, fire experience, etc. If more than 200 words, it may be abstracted for publication.)

In (A), the added text permits the ground fault protection device to isolate (disconnect and/or unground) the dc PV array circuits to perform an insulation/ground fault test automatically before allowing the inverter or charge controller to export power. Recent analysis of fires has determined that this test can identify ground fault problems that are not easily identified by other means. This test would normally be preformed automatically at system start up and possibly any time the inverter or charge controller restarted during the day. Existing code language did not allow this isolation function that can involve ungrounding the PV array when no ground fault action is indicated.

UL 1741 is being modified to address grounded conductor ground faults and to address a morning wake up insulation test for ground faults.

The Informational Note is necessary because the new definition of "Ground Fault" Art 100 in the 2011 NEC only defines a ground fault between an <u>ungrounded</u> conductor and ground. It does not include the grounded conductor ground fault that can cause objectionable and hazardous currents into the equipment-grounding systems.

Exception 2 is deleted because research and actual fires due to ground faults indicate that over sizing the equipment-grounding conductors would not reduce the potential fire hazard.

A related proposal is being submitted for 690.45

In **B**, the words "Isolating" and "isolated" are replaced with the words "Identifying" and "identified" because the required actions are aimed at additional alerting that a ground fault has occurred and identifying the area where the fault has occurred. These actions do not necessarily isolate the faulted circuit.

5. Copyright Assignment

(a) 🛛 I am the author of the text or other material (such as illustrations, graphs) proposed in the Proposal.

(b) Some or all of the text or other material proposed in this Proposal was not authored by me. Its source is as follows: (please identify which material and provide complete information on its source)

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Signature (Required)

John C. Wiles, J.

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Mail to: Secretary, Standards Council · National Fire Protection Association 1 Batterymarch Park · Quincy, MA 02169-7471 OR Fax to: (617) 770-3500 OR Email to: proposals comments@nfpa.org 8/5/2010